

Amendment Under 37 C.F.R. § 1.116
PCT/IB00/00145
USSN 09/913,314
Attorney Docket Q65608
October 3, 2005

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) Process for secondary reforming comprising the steps of:
 - feeding a gas flow comprising oxygen in a combustion chamber through a feeding duct of a burner;
 - feeding a gas flow comprising hydrocarbons in said combustion chamber through a substantially annular passage defined externally to said feeding duct along a predetermined direction;
 - mixing and reacting said gas flow comprising oxygen with said gas flow comprising hydrocarbons inside said combustion chamber, obtaining a gas flow comprising hydrogen and carbon monoxide;
 - feeding said gas flow comprising hydrogen and carbon monoxide to a catalytic bed which lies below said combustion chamber for carrying out a steam reforming reaction; wherein the process comprises the steps of:
 - feeding said gas flow comprising oxygen in said combustion chamber in the form of a plurality of jets generated by corresponding parallel streamtubes having equal velocity within the gas flow comprising hydrocarbons, the jets being spaced from each other; and

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~~—splitting said plurality of jets within the gas flow comprising hydrocarbons in said combustion chamber;~~

- mixing in said combustion chamber the gas flow comprising oxygen with amounts of gas flow comprising hydrocarbons at local constant ratio.

2. (Previously Presented) Process according to claim 1, wherein said gas flow comprising oxygen crosses with substantial transversal motion said gas flow comprising hydrocarbons in said combustion chamber.

3. (Previously Presented) Process according to claim 1, wherein the fact of subjecting said gas flow comprising oxygen flowing along said feeding duct to an overall pressure drop comprised between 0.25 and 2 bar.

4. (Previously Presented) Process according to claim 1, wherein said jets of the gas flow comprising oxygen are fed into said combustion chamber with a substantially orthogonal motion with respect to the motion of such flow inside said feeding duct.

5. (Previously Presented) Burner for secondary reforming of the type comprising:

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- substantially cylindrical duct (12) of predetermined length for feeding a gas flow comprising oxygen to a combustion chamber (4) beneath the burner;
wherein the burner further comprises:

- at least one collector (15) for said gas flow comprising oxygen radially protruding from an end (12a) of said duct (12) of the burner and in fluid communication therewith, comprising a plurality of nozzles (16) distributed along a perimeter of said at least one collector (15) near a lower end (15a) thereof and arranged spaced from each other.

6. (Previously Presented) Burner according to claim 5, wherein said nozzles (16) are arranged in said at least one collector (15) in only one row.

7. (Previously Presented) Burner according to claim 5, wherein said nozzles (16) have a diameter comprised between 2 and 30 mm, preferably between 5 and 25 mm.

8. (Previously Presented) Burner according to claim 5, wherein said nozzles (16) are flared at an inner side (17') of said at least one collector (15).

9. (Previously Presented) Burner according to claim 5, wherein said lower end (15a) of said at least one collector (15) has a substantially semicircular section.

10. (Previously Presented) Burner according to claim 5, wherein it comprises a plurality of said collectors (15) that extend radially from said end (12a) of said duct (12), said nozzles (16) being distributed along opposite walls (17) of said collectors (15).

11. (Previously Presented) Burner according to claim 10, wherein said nozzles (16) are circular and suitably spaced the one from the other, according to the following relationship:

$$N_i * D_i^2 / (R_i * DR) = C$$

wherein, C is a constant, R_i the radius, i -th circumference passing through the nozzles, N_i the number of nozzles on the circumference with radius R_i , D_i the diameter of the nozzles on the circumference with radius R_i , and the radial distance $DR = (R_{i+1} - R_{i-1})/2$.

12. (Previously Presented) Burner according to claim 10, wherein the opposite walls (17) of said collectors (15) are plane and substantially parallel to each other and extend from said end (12a) of said duct (12) with an angle comprised between 30 and 60° with respect to the axis (A) of the duct (12).

13. (Previously Presented) Burner according to claim 12, wherein the lower end (15a) of said collectors (15) is substantially rectilinear and has a tilt angle comprised between 45 and 90° with respect to said axis (A).

14. (Previously Presented) Burner according to claim 12, wherein said nozzles (16) have a tilt angle with respect to said walls (17) comprised between 90 and 10°.

15. (Previously Presented) Burner according to claim 10, wherein said end (12a) of said duct (12) comprises inside it means (22) for deviating the gas flow comprising hydrocarbons towards said collectors (15).

16. (Previously Presented) Burner according to claim 15, wherein said means comprises a deflector (22) of conical shape whose vertex is provided near an upper portion of said end (12a) of the duct (12).

17. (Previously Presented) Apparatus for secondary reforming comprising

- a substantially cylindrical shell (2) that defines inside a combustion chamber (4) and wherein a catalytic bed (3) is arranged beneath said combustion chamber (4);
- inlet nozzles (8, 9) for a gas flow comprising hydrocarbons and a gas flow comprising oxygen, respectively, in fluid communication with said combustion chamber (4);
- an outlet nozzle (10) for a flow comprising synthesis gas in fluid communication with said catalytic bed (3);

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wherein the apparatus comprises a burner which is provided between said inlet nozzles
(8, 9) and said combustion chamber (4).